Universidad Carlos III de Madrid

SUBJECT: COMPUTER NETWORKS DESIGN AND MANAGEMENT		
MASTER DEGREE: INFORMATICS ENGINEERING	ECTS: 6	QUARTER: 1st

TIMETABLE FOR THE SUBJECT

WEEK	SESSION	DESCRIPTION OF EACH SESSION	GROUP (X mark)		Indicate if a different lecture room is needed (computer, audiovisual, etc.)	HOMEWORK PER WEEK		
			1	2		DESCRIPTION	ATTENDING HOURS	HOMEWORK Max. 7H/WEEK
1	1	Introduction. Course description.				Study references: [1] chapter 1.	1,66	7 H
	2	Network layer. Overview.				Study references: [1] chapters 4 and 5.	1,66	
2	3	Network layer. Mobile IP. Network layer security. IPsec and VPNs				Study references: [1] chapter 6. [1] sectiones 8.1, 8.2, 8.3, 8.7, 8.8 [3] chapter 8 (excepto 8.2.5) [4] chapters 10 and 30.1	1,66	7 H
	4	Network layer exercises.				Solve proposed exercises.	1,66	
3	5	Transport layer. UDP/TCP overview.				Study references: [1] chapter 3	1,66	7 H

	6	Transport layer. TCP new implementations. AQM. DTN.				Study references: [2] section 12.22, chapter 15 [2] sectiones 14.6-14.11 [3] section 5.3.7 [7] section 6.7	1,66	
4	7	Transport layer. Transport layer security. TLS/DTLS.				Study references: [5] chapter 4. [1] section 8.6	1,66	7 H
	8	Transport layer exercises.				Solve proposed exercises.	1,66	
5	9	DNS. Overview.				Study references: [1] section 2.5 [3] section 3.2 [6] chapters 1, 2, 3	1,66	7 H
	10	DNS. Advanced concepts. DDNS and DNSSEC.				Study references: [4] chapter 19 [6] chapters 4, 5, 10 and 11	1,66	
6	11	DNS exercises.				Solve proposed exercises.	1,66	7 H
	12	DNS practical assignment.			Telematic Engineering Dept. Lab	Development of the guided practical assignment.	1,66	
7	13	Remote terminal protocols. Telnet, rlogin, and ssh.				Study references: [4] chapter 20	1,66	7 H

	14	File transfer protocols FTP and TFTP.				Study references: [1] section 2.3 [4] chapter 21	1,66	
8	15	Remote terminal and file transfer exercises.				Solve proposed exercises.	1,66	7 H
	16	Remote terminal and file transfer practical assignment.			Telematic Engineering Dept. Lab	Development of the guided practical assignment.	1,66	
9	17	E-mail protocols. Overview. SMTP, MIME, POP.				Study references: [1] section 2.4 [4] chapter 23	1,66	7 H
	18	E-mail protocols. Advanced topics. ESMTP, Security (STARTTLS, S-MIME), spam (spf, dkim), IMAP.				Study references: [3] section 6.3 [1] section 8.5 [4] section 30.3 [6] chapter 8	1,66	
10	19	E-mail exercises.				Solve proposed exercises.	1,66	7 H
	20	E-mail practical assignment.			Telematic Engineering Dept. Lab	Development of the guided practical assignment.	1,66	
11	21	Web. Overview. HTTP/1.X.				Study references: [5] chapter 9 and 11	1,66	7 H

	22	Web. HTTP/2. IoT protocols: CoAP and MQTT.				Study references: [5] chapter 12.	1,66	
12	23	Web. Performance. Browser APIs and protocols. HTTP/3 and QUIC.				Study references: [5] chapters 10, 13, 14, 15, 16, 17, 18	1,66	7 H
	24	Web exercises.				Solve proposed exercises.	1,66	
13	25	Web practical assignment.			Telematic Engineering Dept. Lab	Development of the guided practical assignment.	1,66	7 H
	26	Protocols for multimedia communication.				Study references: [1] chapter 7	1,66	
14	27	Protocols for network management.				Study references: [1] chapter 9	1,66	7 H
	28	Multimedia and network management exercises.				Solve proposed exercises.	1,66	
15-16		Tutorials, Handing in, etc						
17-18		Assessment					3,33	32

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TOTAL HOURS	50	130

References:

[1] Kurose, James F, and Keith W. Ross. "Computer Networking: A Top-Down Approach." 6th Ed. Pearson. 2013.

New edition: Kurose, James F, and Keith W. Ross. "Computer Networking: A Top-Down Approach." 7th Ed. Pearson. 2017.

[2] Dordal, Peter L. "An Introduction to Computer Networks." edition 1.9.18. 2019. http://intronetworks.cs.luc.edu

[3] Ying-Dar Lin, Ren-Hung. "Computer networks: an open source approach". McGraw-Hill. 2012.

[4] Forouzan, Behrouz A. "TCP/IP protocol suite". 4th ed. McGraw-Hill. 2010

[5] Ilya Grigorik. "High Performance Browser Networking". O'Reilly. 2013. https://hpbn.co/

Chapter 12 updatee: Ilya Grigorik. "HTTP/2: A New Excerpt from High Performance Browser Networking". O'Reilly. 2015. https://hpbn.co/http2/

[6] Ron Aitchison. "Pro DNS and BIND 10". Apress. 2011.

Additional references:

[7] Subir Varma. "Internet Congestion Control". Morgan Kaufmann. 2015.

[8] Andrew.S.Tanenbaumi, David J. Wetherall. "Computer Networks". 5th Ed. Prentice Hall. 2011.

[9] W. R. Stevens. "TCP/IP Illustrated Vol.1 The protocols". Prentice Hall, 1994.

[10] Kevin R. Fall, W. Richard Stevens. "TCP/IP Illustrated, Vol. 1: The Protocols", 2nd Ed. Addison-Wesley Professional Computing Series. 2012.